

Automated Guided Vehicle with ARDUINO Using Magnetic Sensor

Prof. Ashraf Siddiqui, Vishwakarma Sarvajeet Ravindranath,

Burte Pratik Vishnu, Vishwakarma Vishwaschandra

Department of Computer Engineering

Theem college of Engineering

Boisar Road, Thane, Maharashtra

ABSTRACT

Automated Guided vehicle have been used for transmitting materials and parts between the two workstation or points. This is used to reduce human effort and time. In this project we are making four wheeled prototype that can move along the path from one station to other station. The AGV uses hall effect magnetic sensor to follow the path, the is made up of the magnetic strip or simply magnetic tape. The controller used is arduino uno and motor driver IC L298N which controls all the navigation of agv. No human intervention is required during its task execution. Safety measures are provided to agv by using fire sensor and obstacle detection with the help of buzzer.

Keywords:- Arduino Uno, Arduino IDE, Motor Driver, Magnetic sensor, Fire sensor, Obstacle sensor, Battery and Motor.

I. INTRODUCTION

A robot is reprogrammable multi-functional manipulator designed to place goods, parts, tools or specialized device through variable programmed motions for the performance of task. (Robot institute of America)

According to a robot can be defined as any machine which perform task on its own which is predefined by the programmer and intelligent enough to do things from the previous experiences. And robot is part of artificial intelligence.

Artificial intelligence:

The collective attribute of computer, robot or other device capable of performing functions such as learning, decision making or other human behaviours.

Automation:

It can be defined as the machine is designed to carry out or do variety of task.

Pick and place:

It can be defined as robot to move the product from one place to other or between points.

1.1 Types of AGVs

a).AGVs Towing Vehicle

It was the first of its kind. It is also called as automated guided tracker. In this custom made trailer flatbed trailer and pallet trucks can be used. It is used to carry very large volumes of load.

b). AGVs Unitload Carrier

It is used to transport the unit load onto the vehicle. It is equipped with powered or non-powered roller belt deck or chain custom made deck. Loads can be moved by pallet truck, forklift truck, automatic loading and unloading equipment etc.

c). AGVs Pallet truck

No special device is needed for loading except the loads kept on the pallet .It is limited to floor level loading and unloading with palletized load. It is mainly used for distribution function. Its capacity is around 1000 to 2000 lb. The speed is around is 200ft/min. It can be loaded or unloaded manually or automatically.

d). AGVs Forklift truck

It has the ability to pick up and drop the packet or load on the floor. The pick and drop off heights are different. The truck is able to lift its fork according to the load stands with the range of heights. And it is used where complete automation is necessary or required. It is very expensive agv.

e). AGVs light load transporters.

The capacity of this agv is less than 550 lb. It is used to handle light and small loads over moderate distance. It distribute between storage and number of workstation, which is predefined. The speed is around 100 ft/min, turning radius is 2ft. It is restricted to a specific area.

II. DEVELOPING AN AUTOMATED GUIDED VEHICLE FOR SMALL AND MEDIUM SIZED ENTERPRISES

In 1953, the commercial automated guided vehicle was started in USA. The cost of normal agv is around Rs 8,00,000 or \$ 80,000. So it is very costly to the small sized enterprises. The main goal of the project is to develop a low budget agv with the use of arduino uno board for the small sized enterprises.

III. AUTOMATED GUIDED VEHICLE WITH USE OF ARDUINO UNO

The automated guided vehicle operate on low battery power of 12V, motor driver and hall effect magnetic sensor with fire detection and obstacle detection built in within the module.

3.1 AGV power source and driver system:

The power used by the agv is 12V. And through this 12V battery the motor driver, fire detection sensor, and obstacle detection sensor and arduino uno will be powered. There are four motor connect through the arduino uno and motor driver. The motor has been powered up by 12V battery. The speed of the motor is 500 rpm.

3.2 Control path of agv:

The path of an agv is predefined. i.e fixed path but having multiple location. So the control of agv is done through the program done or uploaded into the arduino uno through the arduino IDE. The path is made up of magnetic tape.

3.3 Navigation of AGV

The navigation of agv is fixed. Fixed navigation is equipped with the sensors like magnetic hall effect sensor. The hall effect magnetic sensor sense the magnetic field around it and then it proceed in line. Whenever hall effect sensor sense the magnetic field motor get operate or rotate and agv moves.

3.4 Safety Systems

Safety of the devices is the measure concern of any device or machine. So for the safety purpose there is use of a two sensors i.e obstacle detection and fire detection with the help of buzzer.

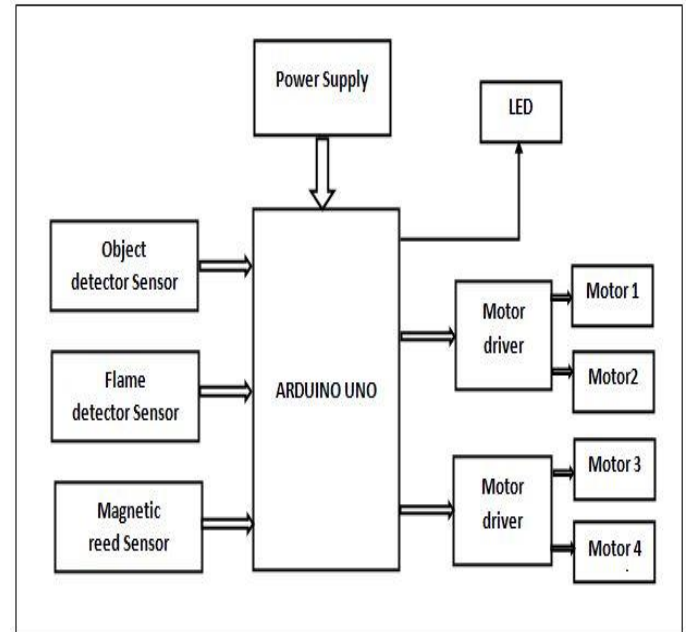
Fire Sensor:

When there is fire around the agv it sense the fire and I start alarm. The buzzer is used to produce the sound or beep.

Obstacle sensor:

When any object comes in front of the agv it must stop for safety purpose. So it is used to stop whenever object comes in front by the infrared rays to detect the obstacle, And also it produce the sound or beep with help of buzzer.

IV. ARCHITECTURE



V. APPLICATIONS

- Industrial automation
- Service for disabled
- Vision systems
- Planetary
- Mine site learning

VI. CONCLUSION

The Science is growing day by day and there has been lot of development in the field of an automated guided vehicle but the advancement has done in the increase of agv cost. The manufacturer of agv faces many difficulties to develop an agv but always ready to face this challenges. Consider china is making their own agvs because of not to buy the product from outside of their country. The agv in this project developed for the small sized enterprises under the budget. And we had developed for the company which is small and has low budget for agv.

REFERENCES

Below the reference of the various research paper and various website of which the complete study had been done and after that we had written paper.

Journals

- [1] Parkvall, S.,Astely, D., “The Evolution of LTE towards IMT-Advanced”. Journal of communications, Vol. 4, No. 3, 2009, pp: 154-164.

Conferences

- [1] Rajeev K Piyare, Member,IAENG, and Ravinesh Singh “Wireless control of an Automated Guided Vehicle”,IMECS2011
- [2] Sajjad Yaghoubi, Sanam Khalili, Reza Mohammad Nezhad, Mohammad Reza Kazemi and Malsa Sakhaiifar, “Designing and methodology of Automated Guided Vehicle robots/ Self Guided Vehicles systems, future trends”, Volume 13 Issue 1/IJRRAS 13 (1) Oct 2012.
- [3] LotharSchulze, Sebastian Behling, and Stefan Buhrs“Automated Guided Vehicle Systems: A driver for increased business performance”, Volume 2 IMECS 2008, 19-21 March, 2008

Books

- [1] World Scientific Series in Robotics and Intelligent Systems: Volume 9Advanced Guided Vehicles Aspects of the Oxford AGV Project Edited by: Stephen Cameron (*Oxford University, UK*), Penelope Probert (*Oxford University, UK*)

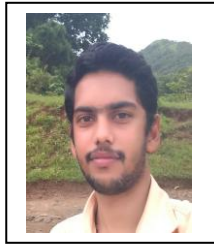
Website

- [1] Roboteq, “Building a magnetic track guided AGV”, AN1326, 26 Nov 2013
<http://roboteq.com/index.php/roboteq-products-and-services/magnetic-guide-sensor>.

ABOUT AUTHORS



Prof. Ashraf Siddiqui
Computer Engineering
Theem college of Engineering
University of Mumbai



Vishwakarma Sarvajeet Ravindranath
B.E Computer Engineering
Theem college of Engineering
University of Mumbai



Burte Pratik Vishnu
B.E Computer Engineering
Theem college of Engineering
University of Mumbai



Vishwakarma Vishwaschandra Surendra
B.E Computer Engineering
Theem college of Engineering
University of Mumbai